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***Operations and Services
Hydrologic Services Program, NWSPD 10-9***

NATIONAL HYDROLOGIC PRODUCTS SPECIFICATION

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OPR: OS31 (J. Dionne)

Certified by: OS3 (T. Graziano)

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SUMMARY OF REVISIONS: This directive supersedes NWS Instruction 10-930, “National Hydrologic Products Specification,” dated March 27, 2003. The following revisions were made to this manual:

- 1) Adds a new Section 2, describing the Advanced Hydrologic Prediction Service Web pages.
- 2) Adds a new Section 6, describing the Precipitation Frequency Data Server.
- 3) Adds a new Section 13, describing the National Snow Analysis.
- 4) Updates Section 14, Probability Of Rainfall Exceeding Flash Flood Guidance Product.
- 5) Incorporates minor editorial changes throughout the directive, including improved captions, updated links, and renumbered pages.

(signed)

August 10, 2006

Dennis McCarthy

Date

Director, Office of Climate,
Water, and Weather Services

National Hydrologic Products Specification

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Appendices

- A. Hydrometeorological Automated Data System Report (RRS) Product Headers A-1
For Individual Weather Forecast Offices and River Forecast Centers

1. Introduction. This directive describes issuance criteria, content, and format of hydrologic information that are national in scope. Products distributed over the Advanced Weather Interactive Processing System (AWIPS) follow standards for World Meteorological Organization (WMO) headings and AWIPS identifiers. Standards for text products distributed over AWIPS and other dissemination systems supported by NOAA's National Weather Service (NWS) are contained in NWS Instruction 10-1701, "Text Product Formats and Codes." Most AWIPS-distributed products are also available on the Internet.
2. National Advanced Hydrologic Prediction Service Web Page. The National Advanced Hydrologic Prediction Service (AHPS) web page is a national portal to many types of hydrologic information generated at weather forecast offices (WFO), river forecast centers (RFC), NWS headquarters, and the National Centers for Environmental Prediction (NCEP). The URL for the site is: <http://www.weather.gov/ahps/>. An example of an AHPS web page is shown below in Figure 1.



Figure 1. Example of National AHPS Web Page.

2.1 Mission Connection. The National AHPS web pages help the NWS meet its mission by providing hydrologic warning and forecast information in a variety of formats and time scales which meet the needs of a range of partners and other users from the layman to the technically advanced water manager. With access to graphical, text, and numerical products through the web, anyone concerned with current and future hydrologic conditions can make informed decisions on a timely basis, thus helping to protect life and property, and enhance the Nation's economy.

2.2 Issuance Guidelines.

2.2.1 Creation Software. AHPS web page is developed and maintained using standard off-the-shelf software (both commercial and open source) for web page development.

2.2.2 Issuance Criteria. Traditional issuance criteria for NWS "push" products (e.g. forecasts or warnings) do not apply. The national systems supporting the national AHPS web page continuously ingest hydrologic forecast and warning products from WFOs, RFCs, NCEP, and national headquarters, performs necessary processing to create graphical, text, and data products for the web, and posts them ready for use on demand.

2.2.3 Issuance Time. Products are available on demand through the web. New versions of AHPS web page information become available when new versions of the numerical/text products which they are based on are issued. For example, an updated graphical hydrograph is produced for the web page when a product with point-based hydrologic forecast information is issued by a WFO or RFC. Extended range products such as long-term exceedence probability graphics may only be generated once or twice a month.

2.3 Technical Description.

2.3.1 Content. The entry point for the national AHPS web page is a national map showing river/stream locations for which some form of short-term hydrologic forecast service is provided by the NWS. Each service location shown on the map is color coded to indicate the current river/stream status with respect to flood stage. Clicking on a location on the national map brings up another map showing a more localized region which encompasses the location just clicked on.

2.3.2 Partner Attribution. Because of the importance of the strategic relationship between the NWS and the U. S. Geological Survey (USGS), all national AHPS web page graphics involving stream gaging stations supported by the USGS will include attribution to the USGS. In most cases, other organizations are involved in cooperative arrangements with the USGS to support stream gaging stations. To the maximum degree possible, attribution should also be provided to these organizations, along with the USGS.

In cases where the USGS is not involved in supporting the stream gaging station, attribution may be provided to the appropriate organization(s).

2.3.3 Format. Example of a flood hydrograph, flood impact information, and forecast point resources accessed through the AHPS web page are shown below in Figures 2 and 3.

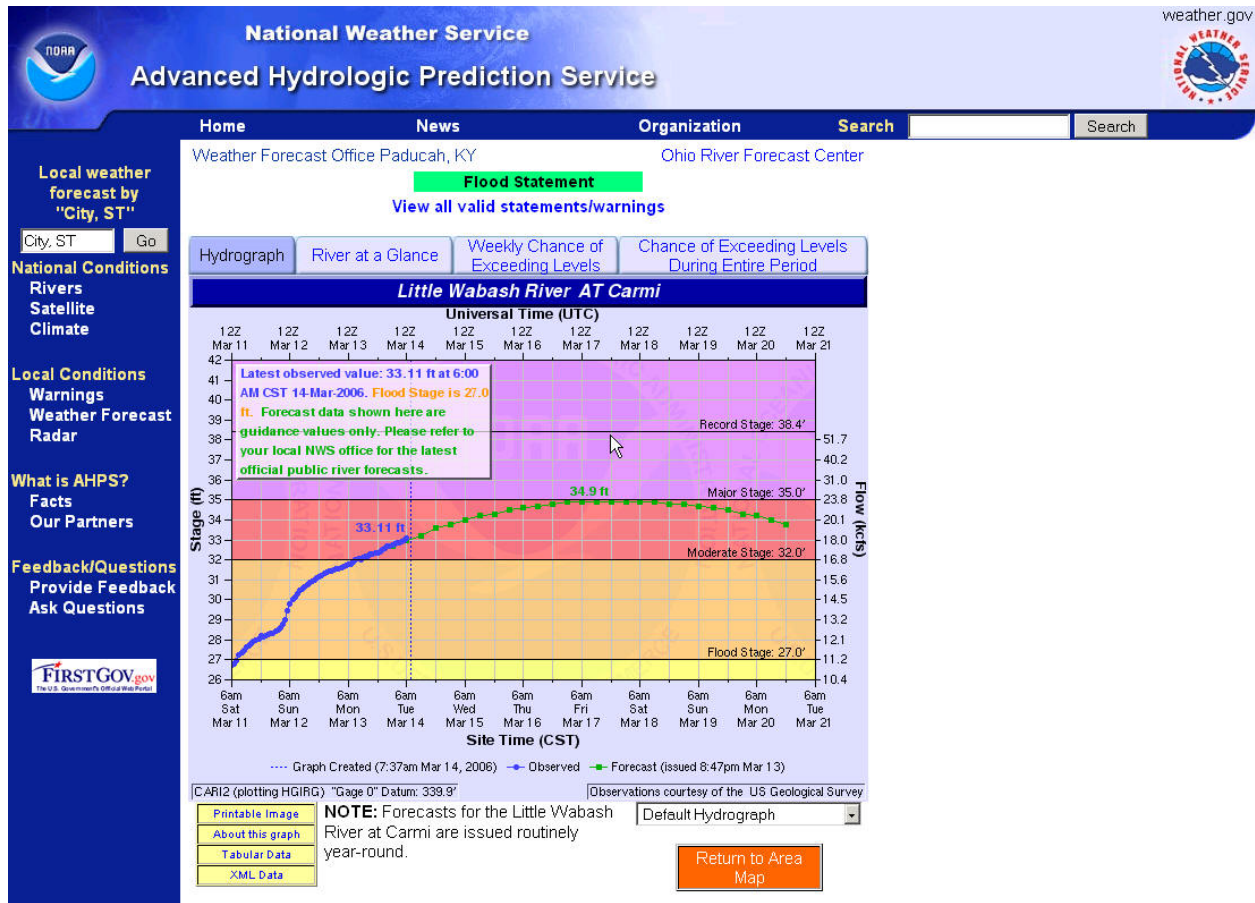


Figure 2. Sample hydrograph for a forecast point, accessed through the AHPS web page.

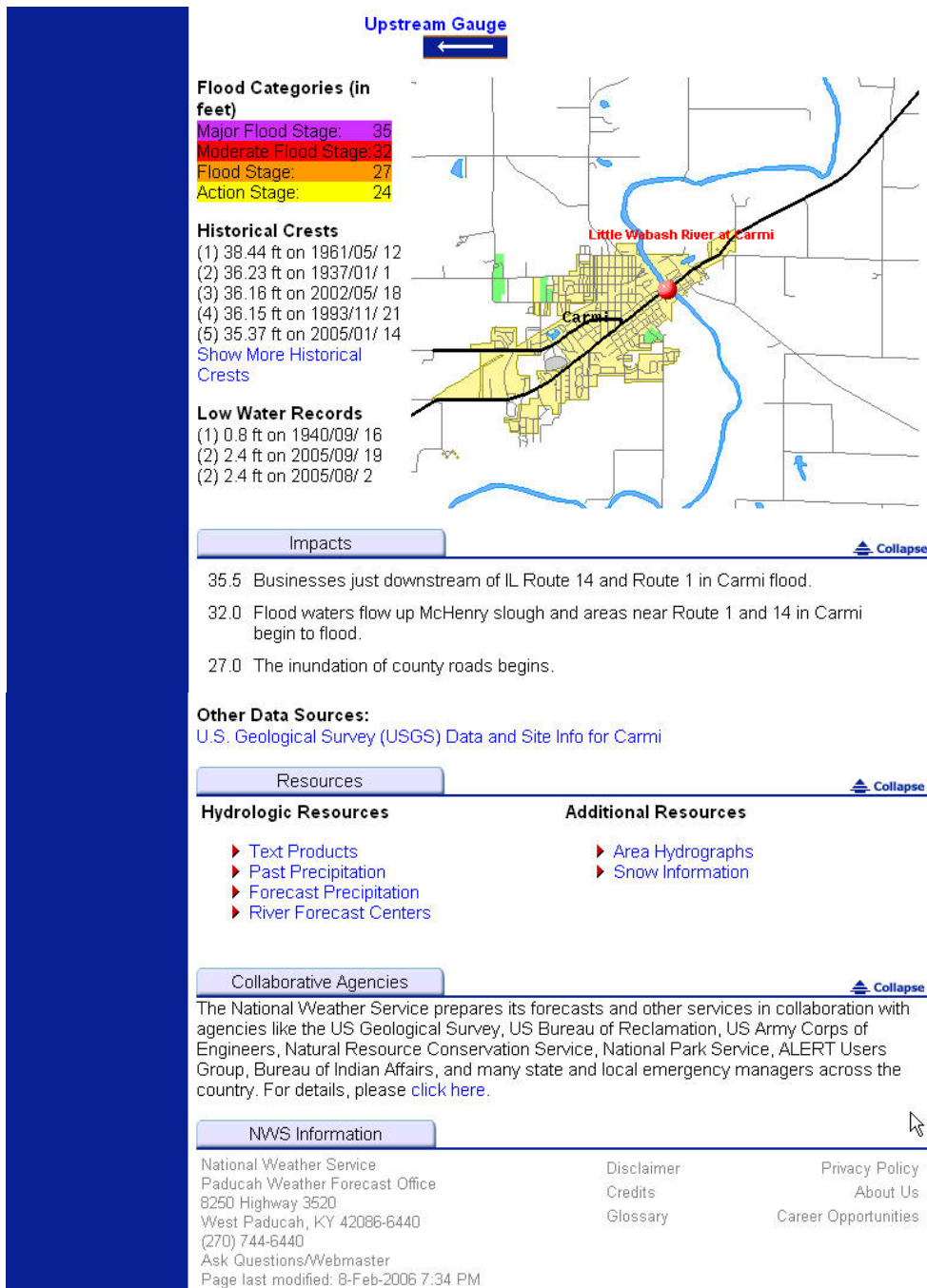


Figure 3. AHPS web page flood impacts and resources information for a forecast point.

2.4 Updates, Amendments and Corrections. Web content is updated as new information becomes available.

3. National Hydrologic Summary (FLN). The National Hydrologic Summary is prepared by the Office of Climate, Water, and Weather Services' Hydrologic Information Center and provides a synopsis of flooding since its last issuance. The National Hydrologic Summary is based on Information disseminated by WFOs.

3.1 Mission Connection. The National Hydrologic Summary helps the NWS meet its mission by providing a single source of flood information which is used by the public, government agencies and the media.

3.2 Issuance Guidelines.

3.2.1 Creation Software. Use appropriate word processing software.

3.2.2 Issuance Time. Issue daily, Monday through Friday and on weekends and holidays when major flooding occurs.

3.3 Technical Description.

3.3.1 MND Product Type Line. Use: "NATIONAL HYDROLOGIC SUMMARY."

3.3.2 Content. The product includes three parts: (1) general summary of flooding, (2) enumeration of areas where flooding occurred and (3) specification of rivers in flood or expected to flood.

3.3.3 Format. Follow the generic format shown in Figure 4 below.

FGUS71 KWBC ddhhmm	(WMO Heading)
FLNNMC	(AWIPS ID)
NATIONAL HYDROLOGIC SUMMARY	(NWS Product Name)
NATIONAL WEATHER SERVICE HEADQUARTERS	(Issuing Office)
time am/pm time_zone day mon dd yyyy	(Issuance time/date)
FLOOD SUMMARY	
<Brief narrative summary of flooding in Nation>	
OUTLOOK FOR TODAY	
<Narrative hydrometeorological outlook for the Nation>	
FLOODING	
<List of states/counties where flooding was reported>	
RIVER FLOODING:	
<List of rivers and streams with locations either above flood stage or expected to rise above flood stage, grouped by state>	
\$\$	
<Author name>	
HYDROLOGIC INFORMATION CENTER	

Figure 4. Generic format for the National Hydrologic Summary.

3.4 Updates, Amendments and Corrections. Issue supplemental summaries during major flood events.

4. National Hydrologic Assessment. Many parts of the U.S. experience late winter and spring flooding. Snow melt and ice jams can be important contributors to this flooding in

northern areas. In late winter and early spring, the Hydrologic Information Center integrates information from both WFOs and RFCs and prepares a National Hydrologic Assessment which summarizes potential for such flooding. This site can be found at:

<http://www.nws.noaa.gov/oh/hic/nho/index.shtml>.

4.1 Mission Connection. This product helps the NWS meet its mission by highlighting areas of possible flooding during the late winter and spring months, thus providing an integrated assessment which can be used to initiate mitigation activities at the national level.

4.2 Issuance Guidelines.

4.2.1 Creation Software. The Hydrologic Information Center uses commercial off-the-shelf web authoring, graphics, and GIS (Geographic Information System) software.

4.2.2 Issuance Criteria. Issue on a schedule coordinated with RFCs and WFOs to ensure that both local and national requirements can be met with minimum duplication of effort.

4.2.3 Issuance Time. Issued on a bi-weekly basis, from late January through March. If conditions warrant, issue updates more frequently and/or extend the issuance period.

4.3 Technical Description.

4.3.1 Dissemination. The National Hydrologic Assessment is provided exclusively on the Internet at: <http://www.nws.noaa.gov/oh/hic/nho/index.shtml>.

4.3.2 Content. RFCs issue Extended-Range Streamflow Prediction Products (see NWS Instruction 10-912) which serve as guidance for Hydrologic Outlooks issued by WFOs (See NWS Instruction 10-922). The Hydrologic Information Center uses these products as the basis for the National Hydrologic Assessment.

The main web page includes a map summarizing hydrologic conditions and a text summary. It also includes links to products provided by WFOs and RFCs, as well as to information on factors that affect the assessment (e.g., snow cover, soil moisture, stream flow conditions, etc.)

4.3.3 Format. The National Hydrologic Assessment is web-based with a main page and links to supporting web pages.

4.4 Updates, Amendments and Corrections. Update the main web page according to a schedule coordinated annually with the NWS regions and the Climate Prediction Center. Post updates issued by individual WFOs and RFCs as they become available.

5. National Significant River Flood Outlook. This graphical product broadly identifies areas where potential exists for significant river flooding over a 5-day period. The term “significant flooding” includes flooding falling in the moderate and major categories as defined in NWS Instruction 10-950. The product is prepared by the NCEP Hydrometeorological Prediction Center and is a mosaic of individual graphical outlooks from the CONUS (CONterminous United States) RFCs (see NWS Instruction 10-912).

A separate outlook is provided for Alaska by the Alaska-Pacific River Forecast Center.

5.1 Mission Connection. This information helps the NWS to meet its mission by graphically depicting areas of river flood potential over the entire Nation. This helps partners and other users focus and optimize their flood mitigation activities, thus protecting lives and property and enhancing the national economy.

5.2 Issuance Guidelines.

5.2.1 Creation Software. Use N-AWIPS (National Centers-AWIPS) software or other applications as appropriate.

5.2.2 Issuance Criteria. Issue the outlook daily.

5.2.3 Issuance Time. Issue the outlook at approximately 4 p.m., Eastern Time.

5.2.4 Valid Time. The product is valid until updated.

5.3 Technical Description.

5.3.1 Dissemination. Issue encoded product with contours used on the Web graphic on AWIPS using an AWIPS ID (identifier) of **GPHWNH** and WMO Header of **PENJ88 KWNH**. The national web page provides links to individual RFC depictions and each RFC web page provides a link to the National Significant River Flood Outlook product. The national product can be found at: <http://www.hpc.ncep.noaa.gov/nationalfloodoutlook/index.html>

5.3.2. Content. Using the color/patterns used in the sample product shown in section 5.3.3, characterize flood potential according to the following criteria:

- a. Possible: Hydrometeorological conditions indicate that significant flooding could occur. Such flooding is neither certain nor imminent.
- b. Likely: Hydrometeorological conditions indicate that significant flooding can be expected during the outlook period.
- c. Occurring/Imminent: Significant flooding is already occurring or is imminent during the outlook period.

5.3.3 Format. A sample significant river flood potential outlook product is shown in Figure 5.

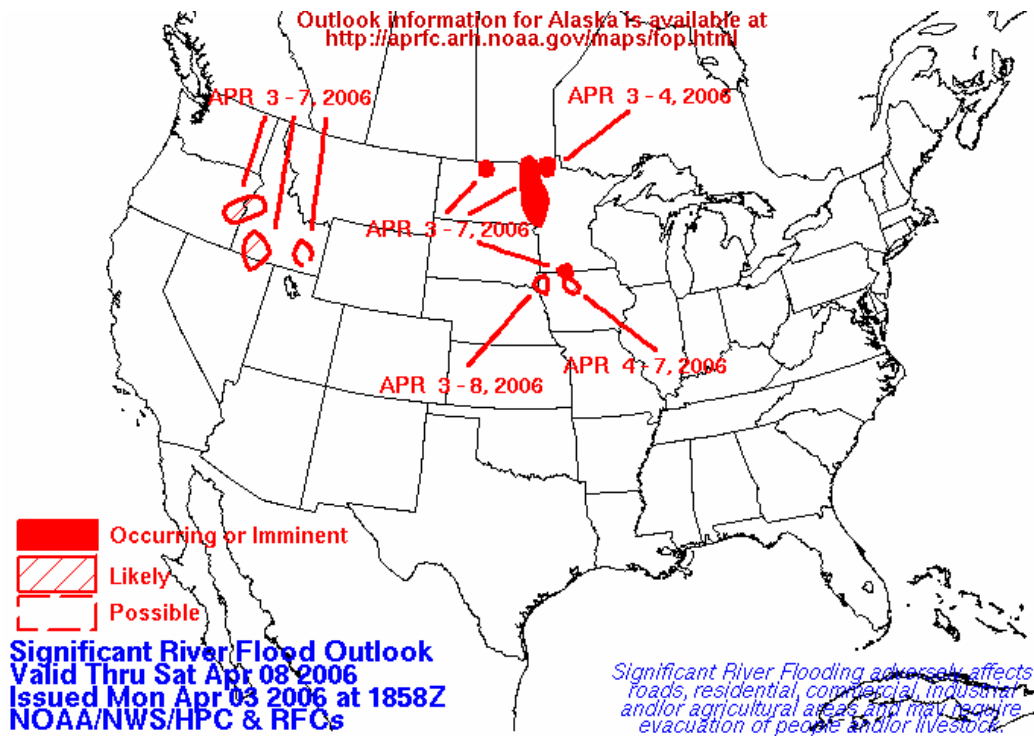


Figure 5. Example of a significant river flood potential outlook product.

6. Precipitation Frequency Data Server. The Precipitation Frequency Data Server makes NWS precipitation frequency estimates available via the World Wide Web. NWS precipitation frequency estimates have traditionally been delivered in hard copy documents such as Weather Bureau Technical Papers and Memoranda as well as NOAA Atlases. These documents have been scanned and made available via web pages and updated estimates are provided in digital form. The NWS specifically developed the Precipitation Frequency Data Server as the primary web portal to precipitation frequency estimates and associated information.

Civil Engineers use these probabilistic estimates of rainfall intensities to design a wide range of structures from urban storm water drainage systems to dams and spillways. Precipitation frequency estimates are also used in environmental management and analysis.

6.1 Mission Connection. The rainfall frequency atlases and technical papers published by the NWS serve as de-facto national standards for rainfall intensity at specified frequencies and durations in the U.S. They are provided in accordance with NOAA's Strategic Plan Mission Goal 2; "Understand climate variability and change to enhance society's ability to plan and respond."

6.2 Issuance Guidelines. The Precipitation Frequency Data Server itself is a delivery system in continuous operation. It provides the most currently available information. Updates to precipitation frequency estimates are made as reanalysis studies are completed by the Office of Hydrologic Development's Hydrometeorological Design Studies Center.

6.2.1 Creation Software. The Precipitation Frequency Data Server was developed using custom software running on a web server.

6.2.2 Issuance Criteria. Traditional issuance criteria for NWS “push” products do not apply.

6.2.3 Issuance Time. Products are available on demand through the web.

6.2.4 Valid Time. Not applicable

6.3 Technical Description.

6.3.1 Dissemination. The Precipitation Frequency Data Server disseminates all available NWS precipitation frequency products and information provided to the public via the World Wide Web. This site home page is at <http://www.nws.noaa.gov/hdsc/pfds/index.html>.

6.3.2 Content. All available NWS precipitation frequency products.

6.3.3 Format. The Precipitation Frequency Data Server is web-based with a map-based main page and links to supporting web pages (Figure 6).

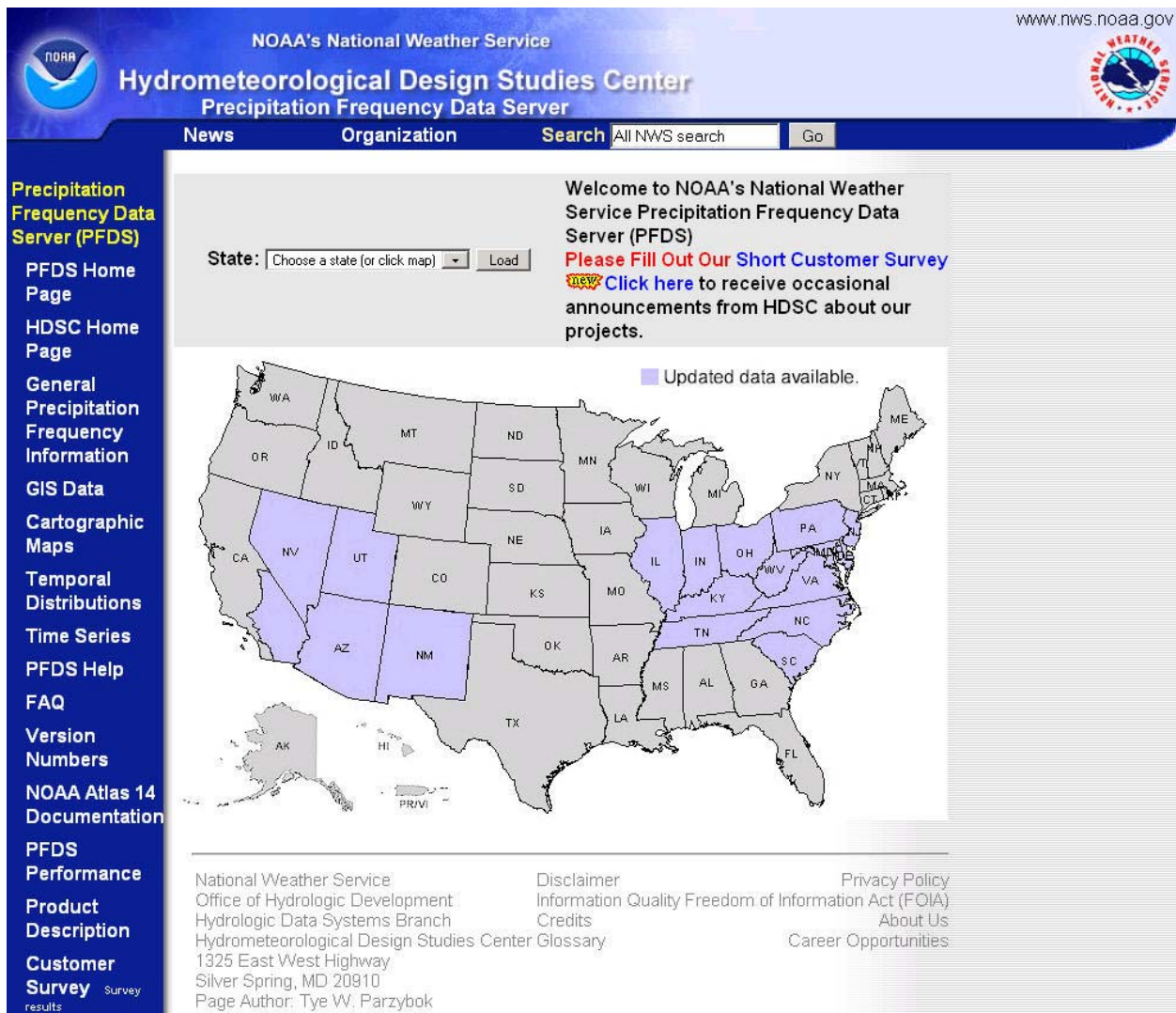


Figure 6. Initial display – Precipitation Frequency Data Server web page.

6.4 Updates, Amendments, and Corrections. New studies may be performed on an irregular basis to update precipitation frequency information for a designated region of the U.S. Upon completion of a study, the information on the Precipitation Frequency Data Server is updated.

7. Hydrometeorological Automated Data System Report (RRS). These products provide hydrometeorological observations in near real time to support NWS operations. These products are generated by the Hydrometeorological Automated Data System (HADS).

7.1 Mission Connection. HADS reports support the NWS mission by providing critical automated sensor data which is used in RFC operations, WFO hydrologic operations, fire weather operations, and other NWS operations which require near real-time hydrometeorological data.

7.2 Issuance Guidelines.

7.2.1 Creation Software. Custom software decodes telemetered data, stores it, provides for quality control, and encodes data in Standard Hydrometeorological Exchange Format (SHEF).

7.2.2 Issuance Time. Issue multiple times each day upon receipt of data.

7.3 Technical Description.

7.3.1 Dissemination. The headers used in the RRS product to support each individual WFO and RFC are contained in appendix A. WFO headers are also available on the Internet at: http://www.nws.noaa.gov/oh/hads/new_wmo_headers.html.

7.3.2 Content. Messages contain automated river, precipitation and temperature observations.

7.3.3 Format. Encode messages in SHEF using the generic format shown below in Figure 7.

```
SXUS37 KWOH ddhhmm
^NMCRRSxxx                                     (AWIPS ID, special format approved for HADS)

:
: && HADS SOR-xxx
<One or more lines of SHEF-encoded data>
```

Figure 7. Generic format for Hydrometeorological Automated Data System Report.

8. Daily SNOTEL Report (RSD). The Natural Resources Conservation Service's (NRCS) SNOWpack TELelemetry (SNOTEL) network provides automated snow water equivalent, precipitation, temperature, and other hydrometeorological data from high elevation areas of the western U.S. and Alaska. As per a cooperative agreement between the NWS and NRCS, SNOTEL data are collected, processed, and inserted into RSD products by the NRCS and transferred to the NWS for dissemination.

8.1 Mission Connection. SNOTEL data are obtained from high elevation areas of the western U.S. and Alaska and are used by WFOs and RFCs to monitor snow pack conditions in support of the NWS hydrology program.

8.2 Issuance Guidelines.

8.2.1 Creation Software. These products are created by the NRCS using appropriate software.

8.2.2 Issuance Time. The NRCS produces messages on both a daily and hourly basis. The NWS transmits messages as received.

8.3 Technical Description.

8.3.1 Dissemination. Table 1 identifies various headers used to provide data in the western U.S. and Alaska.

State	WMO Header	AWIPS Header
Alaska	CXUS86 KSCS	RSD AK
Arizona	CXUS86 KSCS	RSD AZ
California	CXUS86 KSCS	RSD CA
Colorado	CXUS86 KSCS	RSD CO
Idaho	CXUS86 KSCS	RSD ID
Montana	CXUS86 KSCS	RSD MT
Nevada	CXUS86 KSCS	RSD NV
New Mexico	CXUS86 KSCS	RSD NM
Oregon	CXUS86 KSCS	RSD OR
South Dakota	CXUS86 KSCS	RSD SD
Utah	CXUS86 KSCS	RSD UT
Washington	CXUS86 KSCS	RSD WA
Wyoming	CXUS86 KSCS	RSD WY

Table 1. RSD product headers, by state.

8.3.2 Content. The product contains precipitation, snow, and temperature observations.

8.3.3 Format. Encode messages in SHEF using the generic format shown below in Figure 8.

```

ZCZC NMCERSDxx
SRUW24 KSCS ddhhmm
<.B format header>
: U.S. DEPT. OF AGRICULTURE - Natural Resources Conservation Service.
: PROVISIONAL DATA, SUBJECT TO REVISION.
:
<SHEF-encoded SNOTEL data>
:
: <Comments if required>
.END

```

Figure 8. Generic format for Daily SNOTEL Report.

9. Monthly SNOTEL Report (RSM). The NRCS SNOTEL network provides automated snow water equivalent, precipitation, temperature, and other hydrometeorological data from high elevation areas of the western U.S. and Alaska. As per a cooperative agreement between the NWS and NRCS, SNOTEL data are collected, processed, and inserted into RSM products by the NRCS and transferred to the NWS for dissemination. Monthly SNOTEL Reports contain summaries of SNOTEL network observations which have been quality controlled by the NRCS. The monthly summaries are prepared by the NRCS and transferred to the NWS for dissemination.

9.1 Mission Connection. Monthly SNOTEL Reports help the NWS meet its mission by providing data summaries which can be used in forecasting water supply and snow melt runoff.

9.2 Issuance Guidelines.

9.2.1 Creation Software. These products are created by the NRCS using appropriate software.

9.2.2 Issuance Time. Products are issued early in the month and in the middle of the month from January through May or June, depending on the duration of the snow melt season. NWS transmits messages when received.

9.3 Technical Description.

9.3.1 Dissemination. Table 2 identifies various headers used to provide data in the western U.S. and Alaska.

State	WMO Header	AWIPS Header
Alaska	CSUS86 KSCS	RSM AK
Arizona	CSUS86 KSCS	RSM AZ
California	CSUS86 KSCS	RSM CA
Colorado	CSUS86 KSCS	RSM CO
Idaho	CSUS86 KSCS	RSM ID
Montana	CSUS86 KSCS	RSM MT
Nevada	CSUS86 KSCS	RSM NV
New Mexico	CSUS86 KSCS	RSM NM
Oregon	CSUS86 KSCS	SM OR
South Dakota	CSUS86 KSCS	RSM SD
Utah	CSUS86 KSCS	RSM UT
Washington	CSUS86 KSCS	RSM WA
Wyoming	CSUS86 KSCS	RSM WY

Table 2. RSM product headers, by state.

9.3.2 Content. The messages contain precipitation and snow totals, as well as temperature averages.

9.3.3 Format. Encode messages in SHEF using the generic format shown in Figure 9 below.

```
CSUS86 KSCS ddhhmm
RSMxx

<.B Format header>
: U.S. DEPT. OF AGRICULTURE - Natural Resources Conservation Service
: PROVISIONAL DATA, MONTHLY CORRECTED SNOTEL PRECIPITATION ACCUMULATION
: DATA
<SHEF-encoded data>
.END
```

Figure 9. Generic format for Monthly SNOTEL Report.

10. Airborne Survey Gamma Product (RRM). These products are prepared by the National Operational Hydrologic Remote Sensing Center (NOHRSC). They contain snow water equiv-

alent (SWE) data collected from aircraft during the January through April period. Products may also include remotely-sensed soil moisture information.

10.1 Mission Connection. These products help the NWS meet its mission by providing data over areas which may have little or no ground-based sensors measuring snow water equivalent. Data from these products allow snow accumulation and melt to be accounted for in river and flood forecasts, water supply forecasts, and spring flood outlooks for areas affected by snow.

10.2 Issuance Guidelines.

10.2.1 Creation Software. Use customized software known as the Operational Product Processing System (OPPS) to create products.

10.2.2 Issuance Criteria. Issue when airborne data are processed and ready for distribution.

10.2.3 Issuance Time. Schedule times and areas for airborne surveys and subsequent product issuances based on national snow cover conditions and operational requirements of field offices. One consideration is the schedule for issuance of WFO spring snowmelt flood outlook products. This schedule can be found at: <http://www.nohrsc.noaa.gov/snowsurvey/>.

10.3 Technical Description.

10.3.1 Dissemination. Issue products over AWIPS based on Table 3 and post products to the NOHRSC web page at <http://www.nohrsc.noaa.gov/snowsurvey/>.

AWIPS ID	WMO Header	Description
MSPRRMASB	SRUS43 KMSR	Airborne Soil Moisture by Basin
MSPRRMASF	SRUS43 KMSR	Airborne Soil Moisture by Flight Line
MSPRRMASP	SRUS43 KMSR	Airborne SWE by Flight Line
MSPRRMASW	SRUS43 KMSR	Airborne Estimated SWE by Basin

Table 3. RRM product headers.

10.3.2 Content. Messages contain SWE and/or soil moisture information encoded in SHEF. Explanatory notes may also be included. SHEF is described in NWS Manual 10-944 at: <http://www.nws.noaa.gov/directives/sym/pd01009044curr.pdf>.

10.3.3 Format. Encode messages in SHEF, using generic format shown below in Figure 10.

```

SRUS43 KMSR ddhhmm
RRMxxx
<.B Format header>
:TO ----- Service Hydrologist (Please give HARDCOPY to SH)
:FROM ---- Tom Carroll, (952) 361-6610 ext 225, Minneapolis, Minnesota
:Visit our web page at www.nohrsc.nws.gov
:SUBJECT - AIRBORNE SWE DATA 010218210638
:-----
: Total No. of flight lines sent = #
:-----
:Line Survey %SC SWE SWE %SM Est Fall %SM Pilot
:No. Date (in) (35%) (M) Type Date (F) Remarks
:=====
<One or more lines of SHEF-encoded flight line data>
.END
<Narrative summary, if required>

```

Figure 10. Generic format for NOHRSC Airborne Survey Gamma Product

11. Satellite Areal Extent of Snow Cover Product (SCV). These products are prepared by the NOHRSC and contain satellite-based estimates of snow cover in the CONUS and adjacent portions of Canada.

11.1 Mission Connection. These products help the NWS meet its mission by providing spatial snow cover information for areas which may have little or no other observation sources. This information is used by WFOs and RFCs when analyzing hydrologic conditions and preparing water supply forecasts, and spring flood outlooks for snow-affected areas.

11.2 Issuance Guidelines.

11.2.1 Creation Software. Use customized software known as the Operational Product Processing System (OPPS) to create products.

11.2.2 Issuance Criteria. Issue products daily when there is significant snow cover.

11.2.3 Issuance Time. Issue products at approximately 1500 UTC.

11.3 Technical Description.

11.3.1 Dissemination. Issue SCV products over AWIPS using headers shown in Table 4 and post products on the NOHRSC web page at: http://www.nohrsc.noaa.gov/nh_snowcover/.

AWIPS ID	WMO Header	Description
MSPSCVACR	SRUS43 KMSR	Estimated SCV by Basin for APRFC
MSPSCVALR	SRUS43 KMSR	Estimated SCV by Basin for SERFC
MSPSCVFWR	SRUS43 KMSR	Estimated SCV by Basin for WGRFC
MSPSCVKRF	SRUS43 KMSR	Estimated SCV by Basin for MBRFC
MSPSCVMSR	SRUS43 KMSR	Estimated SCV by Basin for NCRFC
MSPSCVORN	SRUS43 KMSR	Estimated SCV by Basin for LMRFC
MSPSCVPTR	SRUS43 KMSR	Estimated SCV by Basin for NWRFC
MSPSCVRHA	SRUS43 KMSR	Estimated SCV by Basin for MARFC
MSPSCVRSA	SRUS43 KMSR	Estimated SCV by Basin for ABRFC

MSPSCVSTR	SRUS43 KMSR	Estimated SCV by Basin for CNRFC
MSPSCVTAR	SRUS43 KMSR	Estimated SCV by Basin for CBRFC
MSPSCVTIR	SRUS43 KMSR	Estimated SCV by Basin for NERFC
MSPSCVTUA	SRUS43 KMSR	Estimated SCV by Basin for OHRFC

Table 4. SCV product headers.

11.3.2 Content. Messages contain SWE and/or soil moisture information encoded in SHEF. Explanatory notes may also be included. SHEF is described in NWS Manual 10-944 at: <http://www.nws.noaa.gov/directives/sym/pd01009044curr.pdf>.

11.3.3 Format. Encode messages in SHEF. The generic format is shown below in Figure 11.

```
SRUS43 KMSR ddhhmm
SCVxxx

<.B Format Header>
:-----
:NATIONAL WEATHER SERVICE - OFFICE OF CLIMATE, WATER, AND WEATHER SERVICES
:NATIONAL OPERATIONAL HYDROLOGIC REMOTE SENSING CENTER
:CHANHASSEN MINNESOTA (952) 361-6610
:-----
:SATELLITE AREAL EXTENT OF SNOW COVER (PERCENT) BY ELEVATION ZONES (1000FT)
:COMPOSITE ANALYSIS yymmddhhstart - yymmddhhend
:
: BASIN      SA      NAME
:
:                               EZONE1  EZONE2  EZONE3  EZONE4  EZONE5  EZONE6

<One or more lines of SHEF-encoded data>
.END
NNNN
```

Figure 11. Generic format for Satellite Areal Extent of Snow Cover product.

12. Estimated Snow Water Equivalent by Basin Product (SWE). These products are prepared by the NOHRSC from January through April. They contain estimated SWE amounts for the CONUS based on an integration of data assembled over the previous 24-hour period.

12.1 Mission Connection. These products help the NWS meet its mission by providing snow water equivalent data for individual stream basins. This allows snow accumulation and melt to be accounted for in river and flood forecasts, water supply forecasts, and spring flood outlooks issued for all basins affected by snow.

12.2 Issuance Guidelines.

12.2.1 Creation Software. Use customized software known as the Operational Product Processing System (OPPS) to create products.

12.2.2 Issuance Criteria. Issue products for each RFC where snow is present.

12.2.3 Issuance Time. Issue products at approximately 1500 UTC.

12.3 Technical Description.

12.3.1 Dissemination. Issue SWE products over AWIPS using headers shown in Table 5 and post products to the NOHRSC web page.

AWIPS ID	WMO Header	Description
MSPSWEACR	SRUS43 KMSR	Estimated SWE by Basin for APRFC
MSPSWEALR	SRUS43 KMSR	Estimated SWE by Basin for SERFC
MSPSWEFWR	SRUS43 KMSR	Estimated SWE by Basin for WGRFC
MSPSWEKRF	SRUS43 KMSR	Estimated SWE by Basin for MBRFC
MSPSWEMSR	SRUS43 KMSR	Estimated SWE by Basin for NCRFC
MSPSWEORN	SRUS43 KMSR	Estimated SWE by Basin for LMRFC
MSPSWEPTR	SRUS43 KMSR	Estimated SWE by Basin for NWRFC
MPSWERHA	SRUS43 KMSR	Estimated SWE by Basin for MARFC
MPSWERSA	SRUS43 KMSR	Estimated SWE by Basin for CNRFC
MPSWESTR	SRUS43 KMSR	Estimated SWE by Basin for CBRFC
MPSWETAR	SRUS43 KMSR	Estimated SWE by Basin for NERFC
MPSWETIR	SRUS43 KMSR	Estimated SWE by Basin for OHRFC
MPSWETUA	SRUS43 KMSR	Estimated SWE by Basin for ABRFC

Table 5 SWE product headers

12.3.2 Content. Messages contain SWE and/or soil moisture information encoded in SHEF. Explanatory notes may also be included. SHEF is described in NWS Manual 10-944 at: <http://www.nws.noaa.gov/directives/sym/pd01009044curr.pdf>.

12.3.3 Format. Encode messages in SHEF. The generic format is shown below in Figure 12.

```
SRUS43 KMSR ddmh
SWExxx

<.B Format Header>
:-----
:NATIONAL WEATHER SERVICE - OFFICE OF CLIMATE, WATER, AND WEATHER SERVICES
:NATIONAL OPERATIONAL HYDROLOGIC REMOTE SENSING CENTER
:CHANHASSEN MINNESOTA (952) 361-6610
:-----
:ESTIMATED AIRBORNE SNOW WATER EQUIVALENT (INCHES) BY BASIN BY ELEVATION
ZONES (1000FT)
:ANALYSIS yymmddhh
:
: BASIN      SW      NAME
:              EZONE1 EZONE2 EZONE3 EZONE4 EZONE5 EZONE6
<One or more lines of SHEF-encoded data>
.END
NNNN
```

Figure 12. Generic format for Estimated Snow Water Equivalent by Basin product.

13. National Snow Analysis. The National Snow Analysis (NSA) is a web based suite of products produced by the NOHRSC, which provides comprehensive snow information for the CONUS. The NSA summaries include information about snow water equivalent, snow depth, snow temperature, snowmelt, surface sublimation and condensation, sublimation from blowing snow, snow surface energy exchanges, precipitation, and weather. The NSA snow products are distributed primarily through the NOHRSC web page: <http://www.nohrsc.noaa.gov>. (In addition

to the web-based products, 1 km², gridded, daily snow products for the CONUS are available from the National Snow and Ice Data Center in Boulder: <http://nsidc.org/data/g02158.html>.)

13.1 Mission Connection. The NSA helps the NWS meet its mission making available analyses of snow conditions and data sets that are used by NWS field offices; other federal, state, and local agencies; and the private sector in a variety of applications including operational and research hydrologic modeling for snowmelt and water supply forecasting. This allows for better forecasting and management of increasingly scarce water resources, thus helping to protect life and property and enhance the national economy.

13.2 Issuance Guidelines.

13.2.1 Creation Software. The NSA is produced using output from appropriate snow models, observations and web applications. The web page is developed and maintained using PHP architecture for web page development.

13.2.2 Issuance Criteria. The NSA is a “pull” product which is created and used on demand to contain the requested information. The data contained in the products are updated as operational observations become available and the NSA performs necessary processing to create graphical, text, and data products for the web, and posts them ready for use on demand.

13.2.3 Issuance Time. Snow summaries from the NSA are available daily (excluding weekends and holidays). Interactive, time series data plots and user-selected alphanumeric snow summaries are available on demand through the web.

13.3 Technical Description.



13.3.1 Contents. The NSA uses daily ground-based, airborne, and satellite snow observations from all sources which are available electronically for the coterminous U.S. These data are ingested into a physically-based snow model to generate estimates of snowpack characteristics for the CONUS. The NOHRSC snow model is an energy-and-mass-balance, spatially-uncoupled, vertically-distributed, multi-layer snow model run operationally at 1-km² spatial resolution and hourly temporal resolution for the nation. Ground-based and remotely-sensed snow observations are assimilated daily into the simulated snow-model state variables. NSA output products are distributed in a variety of interactive map, text discussion, alphanumeric, time-series, and gridded formats. Available NSA information includes:

- a. Daily maps at the national or regional scale for the following nine snowpack characteristics: 1) snow water equivalent, 2) snow depth, 3) average snowpack temperature, 4) snow water equivalent change, 5) snow precipitation, 6) snow melt, 7) blowing snow sublimation, 8) surface sublimation, and 9) non-snow precipitation; with the option to display seasonal, two-week, and 24 hour movie-loop animations for the each of these characteristics.
- b. Text summaries of 1) recent weather conditions affecting snowpack, 2) individual stations reporting the most significant amounts of snow, 3) link access to all station reports, 4) areas where notable changes in snowpack were estimated by

the model, and 5) notes on current/pending activity for the airborne snow survey program.

- c. Interactive Snow Information, which allows the user to select the geographic region of interest, the period-of-record of interest, and the physical element of interest. The summary has pan, zoom, and query functionality. End-users can query on numerous physical elements including: snow water equivalent, snow depth, snowpack temperature, snow precipitation, non-snow precipitation, surface air temperature, solar radiation, relative humidity, daily change in snow water equivalent, daily change in snow depth, daily snowmelt, daily blowing snow sublimation, daily surface sublimation/condensation, daily average snowpack temperature, and daily snow precipitation.
- d. Station time-series plots (graphic), which are a series of graphic plots using data from a selected reporting station for a selected period-of-record. The plots include line graphs of NOHRSC snow model output and point indicators for a variety of observed hydrometeorological variables.
- e. Alphanumeric snow summaries (text), which are for selected NSA physical elements and are available in SHEF on a hydrologic basin-by-basin basis. The SHEF is described in NWS Manual 10-944 at: <http://www.nws.noaa.gov/directives/sym/pd01009044curr.pdf>. These alphanumeric summaries are available for snow water equivalent, snow depth, and areal extent of snow cover.

13.3.2 Format. Examples of the National Snow Analysis and Interactive Snow Information web pages are shown in Figures 13 and 14.





National Weather Service
National Operational Hydrologic
Remote Sensing Center

Home News Organization Search Enter Search Here Go

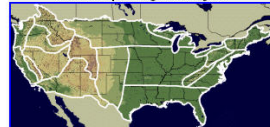
Home

Snow Information
National Analyses
Interactive Maps
3D Visualization
Airborne Surveys
Satellite Obs
Forecasts
Data Archive
SHEF Products
Science/Technology
NOHRSC
GIS Data Sets
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Comments!




National Snow Analyses


[Snow Reports](#)
[Model Assimilation Schedule](#)
[Snow Survey Schedule](#)


Click On Map for Regional Analyses



Automated Model Discussion:
February 22, 2006
Area Covered By Snow: 34.8%
Area Covered Last Month: 32.7%
Snow Depth
Average: 4.5 in
Minimum: 0.0 in
Maximum: 285.9 in
Std. Dev.: 12.7 in
Snow Water Equivalent
Average: 1.2 in
Minimum: 0.0 in
Maximum: 115.0 in
Std. Dev.: 3.9 in
[more...](#)
[Metric Units...](#)


Select Region and Date
National 2006 February 22 Go


Snow Water Equivalent

Animate: Season --- Two weeks --- One Day


Snow Depth

Animate: Season --- Two weeks --- One Day

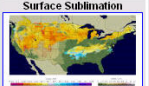
Average Snowpack Temp

Animate: Season --- Two weeks --- One Day


SWE Change

Animate: Season --- Two weeks --- One Day

Snow Precipitation

Animate: Season --- Two weeks --- One Day

Snow Melt

Animate: Season --- Two weeks --- One Day

Blowing Snow Sublimation

Animate: Season --- Two weeks --- One Day

Surface Sublimation

Animate: Season --- Two weeks --- One Day

Non-Snow Precipitation

Animate: Season --- Two weeks --- One Day

Snow Reports

[Metric Units...](#)

Station ID	Name	Elevation (feet)	Snowfall (in)	Duration (hours)	Report Date / Time(UTC)
CLUM4	CALUMET, MI	1197	12.00	24	2006-02-21 16
PEXM4	PHOENIX FARM	994	6.00	12	2006-02-21 15
HOKN6	HOOVER - 7MI NNW	1617	11.50	24	2006-02-21 11
MHOM4	MOHAWK	1040	3.70	12	2006-02-21 13
STRN6	STILLWATER RESERVOIR	1689	7.00	24	2006-02-21 13
ATMM4	ATLANTIC MINE SNW	839	6.50	24	2006-02-21 13
43.0000_078.5800	CLARENCE (BUF1027)	672	6.00	24	2006-02-21 13
42.9000_078.4922	ALDEN (585ALD)	869	5.00	24	2006-02-21 13
POLM4	PAINESDALE	1269	5.00	24	2006-02-21 12
BOSM8	BIG SKY 2 VNNW	6587	4.80	24	2006-02-22 00

Note: these data are unofficial and provisional.

[Station Snowfall Reports](#)
[Station Snow Water Equivalent Reports](#)
[Station Snowdepth Reports](#)

Model Assimilation

A data assimilation was performed on February 16, 2006, for the Northeast, East Coast, and Southern Appalachian snowpacks to incorporate recent ground snow surveys. One to 3 inches of snow water were added in the Tug Hill and Adirondack areas of New York, and there were patchy areas of 1/2 to 1 1/2 inches of additional snow water across the Northeast. Most areas, though, had up to an inch of snow water removed, mainly because the model lagged the observed melt due to warm temperatures in the region.


A data assimilation was also performed for the Cascades. Differences due to overmodeled snowmelt between observed and modeled values were not large, but they were growing, the differences were larger in the southern Cascades. Generally, 1 to 2 inches of snow water was added to the higher elevations. Up to 1/2 inch of snow water was removed from valleys.

NOHRSC Airborne Snow Survey Program

The Airborne program has no scheduled flights in this region for the week of February 20, 2006.

NOHRSC
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National Weather Service
National Operational Hydrologic Remote Sensing Center
1735 Lake Drive W
Chanhassen, MN 55317
Contact NOHRSC
Glossary
Credits
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Figure 13. Example of National Snow Analysis web page.

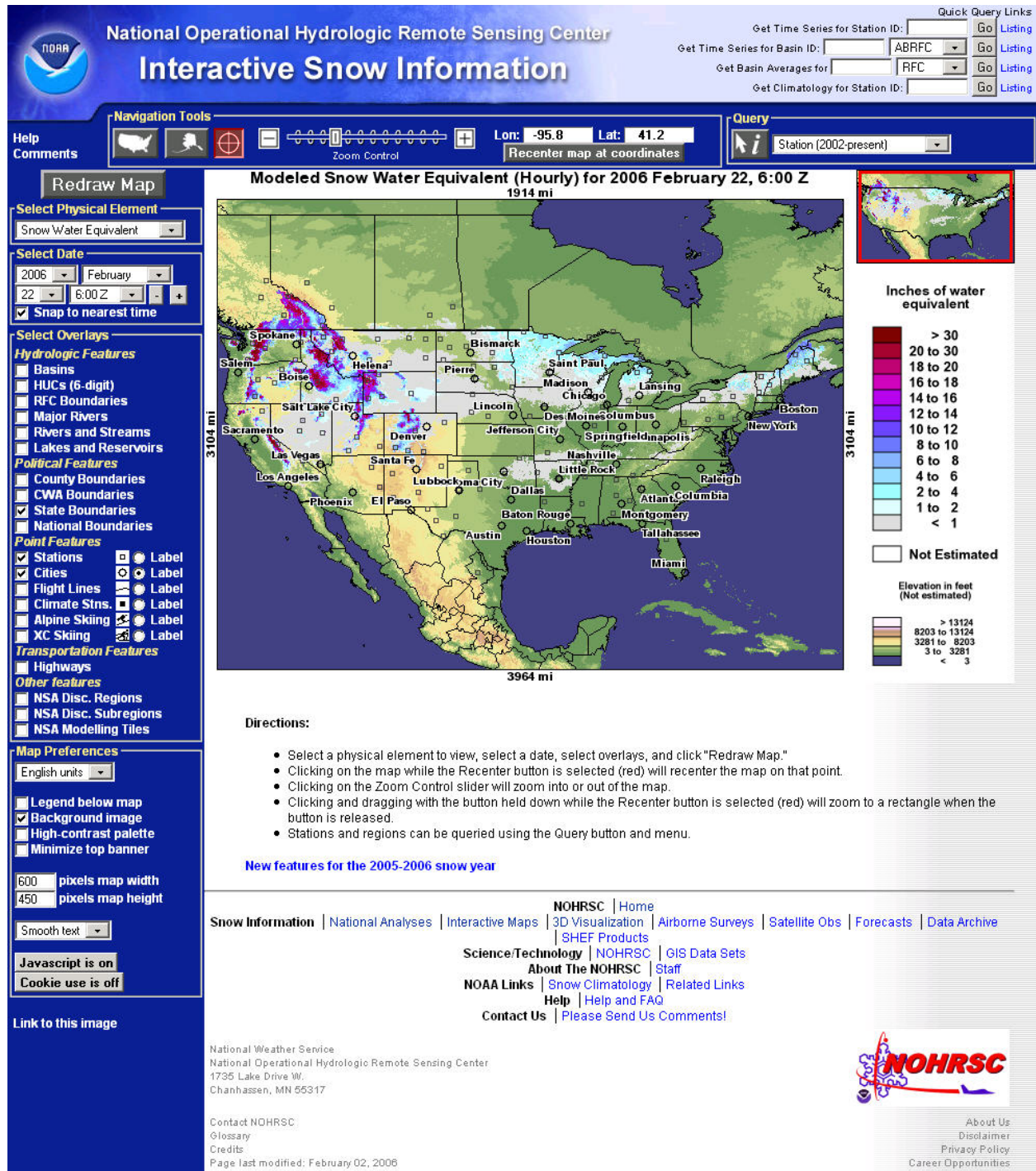


Figure 14. Example of Interactive Snow Information web page

13.4 Updates, Amendments and Corrections. Updates and corrections are made as needed.

14. Probability of Rainfall Exceeding Flash Flood Guidance (94E). This product is prepared by the National Center for Environmental Prediction's (NCEP's) Hydrometeorological Prediction Center (HPC) for the CONUS. The product identifies areas where a probability exists for rainfall to exceed RFC flash flood guidance criteria.

14.1 Mission Connection. This product supports the NWS mission by providing NWS field offices with graphical information showing the areas with forecast probabilities of flash flooding.

14.2 Issuance Guidelines.

14.2.1 Creation Software. Use N-AWIPS software or other applications as appropriate.

14.2.2 Issuance Criteria. Issue the product routinely.

14.2.3 Issuance Time. These products are issued at times indicated in Table 6.

14.2.4 Valid Time. See Table 6.

14.3 Technical Description.

14.3.1 Dissemination. Issue the product on AWIPS based on Table 6. On the web, the product is at: <http://www.hpc.ncep.noaa.gov/qpf/94ewbg.gif>.

HPC CONUS Graphical Flash Flood Guidance Product Schedule				
Issuance Time (UTC)	Valid Time (UTC)	AWIPS ID	WMO Header	Product Description
0000 (optional)	0000-0000	RBG94E	PEI745 KWBC	Rainfall Potential Exceeding Flash Flood Guidance Values and/or 5" during the 24 hours of forecast valid time
0200 (mandatory)	0300-0000	RBG94E	PEI745 KWBC	Rainfall Potential Exceeding Flash Flood Guidance Values and/or 5" during the 21 hours of forecast valid time
0600 (mandatory)	0600-1200	RBG94E	PEI745 KWBC	Rainfall Potential Exceeding Flash Flood Guidance Values and/or 5" during the 30 hours of forecast valid time
1200 (optional)	1200-1200	RBG94E	PEI745 KWBC	Rainfall Potential Exceeding Flash Flood Guidance Values and/or 5" during the 24 hours of forecast valid time
1500 (mandatory)	1500-0000	RBG94E	PEI745 KWBC	Rainfall Potential Exceeding Flash Flood Guidance Values and/or 5" during the 21 hours of forecast valid time
1800 (mandatory)	1800-0000	RBG94E	PEI745 KWBC	Rainfall Potential Exceeding Flash Flood Guidance Values and/or 5" during the 30 hours of forecast valid time
2100 (optional)	2100-0000	RBG94E	PEI745 KWBC	Rainfall Potential Exceeding Flash Flood Guidance Values and/or 5" during the 27 hours of forecast valid time

Table 6. Issuance time, valid time, product ID, and content of flash flood guidance products.

14.3.2 Content. The product depicts areas that forecast the probability of rainfall exceeding the flash flood guidance (FFG). The FFG used are the one, three or six hour FFG as produced daily by the River Forecast Centers across the CONUS.

14.3.3 Format. The product shows areas with risk of exceeding RFC flash flood guidance values or a 5 inch threshold during the valid period. The probability categories and associated color codes used in this product are shown below in Table 7.

NONE FORECAST = 0%	No chance for exceeding FFG
SEE TEXT <20%	Less than a 20% chance of exceeding FFG
SLIGHT RISK 20-39%	20-39% chance of exceeding FFG
MODERATE RISK 40-69%	40-69% chance of exceeding FFG
HIGH RISK >70%	Greater than 70% chance of exceeding FFG
RAINFALL GREATER THAN 5 INCHES	This is a deterministic forecast when it is believed there is a chance for rainfall exceeding five inches during the specified forecast period

Table 7. Threat levels for exceeding flash flood guidance and forecast probabilities along with associated color codes used in Probability of Rainfall Exceeding Flash Flood Guidance product.

“See Text” (for probabilities <20%) is a reference to the Excessive Rainfall Discussion text product (See Section 15). The Slight, Moderate, and High Risk areas are delineated by an enclosed solid line (with arrowhead). The 5 inch area is delineated by an enclosed solid line with a hatched pattern filling the threat region. A sample Rainfall Potential for Exceeding Flash Flood Guidance product is shown below in Figure 15.

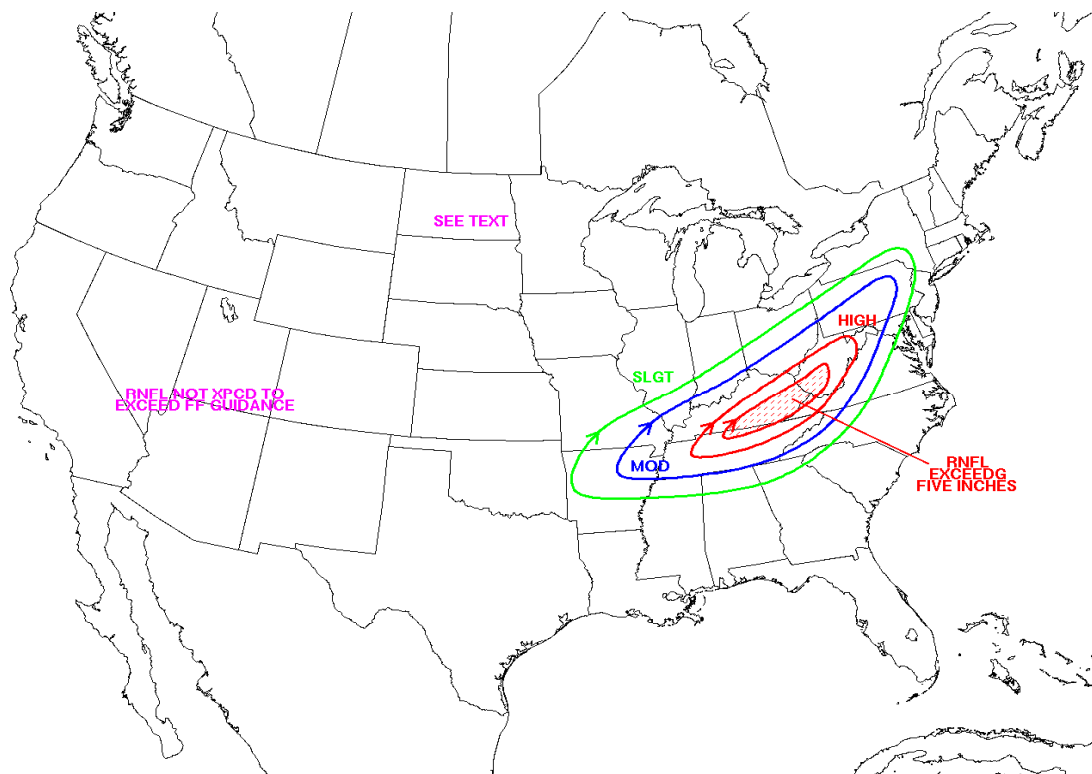


Figure 15. Example of the Rainfall Probability for Exceeding Flash Flood Guidance product.

14.4 Updates, Amendments and Corrections. Update this product if meteorological conditions change or if corrections are needed.

15. Excessive Rainfall Discussion (ERD). This product is prepared by the HPC for the CONUS. The product provides explanation and interpretation of the Rainfall Potential for Exceeding Flash Flood Guidance graphic (see Section 14 above).

15.1 Mission Connection. This product supports the NWS mission by providing NWS field offices with information highlighting the areas with the greatest likelihood of flash flooding.

15.2 Issuance Guidelines.

15.2.1 Creation Software. Use appropriate COTS word processing software.

15.2.2 Issuance Criteria. Issue the product routinely.

15.2.3 Issuance Time. 0300, 0700, 1500, and 1900 UTC.

15.2.4 Valid Time. 0300 -1200 UTC, 1200-1200 UTC, 1500-1200, and 0000-0000 UTC.

15.2.5 Product Expiration Time. Product expires at the end of the valid time.

15.3 Technical Description. The excessive rainfall discussion should follow the format and content described in this section. It is published on the web at:

<http://www.hpc.ncep.noaa.gov/qpf/94ewbg.gif>.

15.3.1 MND Header. Use "EXCESSIVE RAINFALL DISCUSSION."

15.3.2 Content. The product is a text message providing an explanation and interpretation of the Rainfall Potential for Exceeding Flash Flood Guidance graphic.

15.3.3 Format. The generic format is shown in Figure 16 below.

```
FOUS30 KWBC ddhhmm
QPFERD

EXCESSIVE RAINFALL DISCUSSION
NWS HYDROMETEOROLOGICAL PREDICTION CENTER CAMP SPRINGS MD
time am/pm time_zone day mon dd yyyy
...VALID hhZ day mon dd yyyy - hhZ day mon dd yyyy
...REFERENCE AWIPS GRAPHIC UNDER...DAY 1 EXCESSIVE RAINFALL

<discussion text>
<forecaster name>

GRAPHICS AVAILABLE ON THE WEB AT www.hpc.ncep.noaa.gov

$$
```

Figure 16. Generic format for Excessive Rainfall Discussion.

15.4 Updates, Amendments and Corrections. Update under rapidly changing meteorological conditions. Correct for format and grammatical errors as required.

16 6-Hour Quantitative Precipitation Forecasts (Day 1-3). These products, prepared by the HPC, delineate quantitative precipitation forecast (QPF) amounts for specified 6-hour periods. The products are available in both graphical and gridded format.

16.1 Mission Connection. RFCs use QPF as input to hydrologic forecast models. WFOs use QPF to support their river and flash flood warning programs. Graphical QPF products and their gridded versions are posted on the Internet for use by partners and the general public.

16.2 Issuance Guidelines.

16.2.1 Creation Software. Use N-AWIPS software or other applications as appropriate.

16.2.2 Issuance Criteria. Issue the product routinely.

16.2.3 Issuance Time. Issue products according to the schedule indicated in Table 8.

16.2.4 Valid Time. See Table 8.

16.3 Technical Description.

16.3.1 Dissemination. Issue the product on AWIPS based on Table 8. Also post products on the Internet for general public use at: <http://www.hpc.ncep.noaa.gov/qpf/qpf2.shtml>

HPC CONUS 6-hr QPF Product Schedule						
Issuance Time (UTC)	Valid Time (UTC)	Graphical		Gridded		Product Description
		AWIPS ID	WMO Header	AWIPS ID	WMO Header	
0600	0600 - 1200	RBG91E	PEIB40 KWNO	QPF91E	ZEXB98 KWNH	0 - 6 h liquid equivalent QPF
0615	1200 - 1800	RBG92E	PEIC43 KWBC	QPF92E	ZEXC98 KWNH	Preliminary 6-12 h QPF
	1800 - 0000	RBG93E	PEID44 KWBC	QPF93E	ZEXD98 KWNH	Preliminary 12-18 h QPF
	0000 - 0600	RBG9EE	PEIE40 KWNO	QPF9EE	ZEXE98 KWNH	Preliminary 18-24 h QPF
	0600 - 1200	RBG9FE	PEIF40 KWNO	QPF9FE	ZEXF98 KWNH	Preliminary 24-30 h QPF
0700	1200 - 1800	RBG9GE	PEII42 KWBC	QPF9GE	ZEXG98 KWNH	Preliminary 29 - 35 h QPF
	1800 - 0000	RBG9HE	PEBF98 KWNH	QPF9HE	ZEXH98 KWNH	Preliminary 35 - 41 h QPF
	0000 - 0600	RBG9IE	PEBG98 KWNH	QPF9IE	ZEXI98 KWNH	Preliminary 41 - 47 h QPF
	0600 - 1200	RBG9JE	PEBH98 KWNH	QPF9JE	ZEXJ98 KWNH	Preliminary 47 - 53 h QPF
1015	1200 - 1800	RBG92E	PEIC43 KWBC	QPF92E	ZEXC98 KWNH	Final 2 - 8 h QPF
	1800 - 0000	RBG93E	PEID44 KWBC	QPF93E	ZEXD98 KWNH	Final 8 - 14 h QPF
	0000 - 0600	RBG9EE	PEIE40 KWNO	QPF9EE	ZEXE98 KWNH	Final 14 - 20 h QPF
	0600 - 1200	RBG9FE	PEIF40 KWNO	QPF9FE	ZEXF98 KWNH	Final 20 - 26 h QPF
	1200 - 1800	RBG9GE	PEBF98 KWNH	QPF9GE	ZEXG98 KWNH	Final 26 - 32 h QPF
	1800 - 0000	RBG9HE	PEBG98 KWNH	QPF9HE	ZEXH98 KWNH	Final 32 - 38 h QPF
	0000 - 0600	RBG9IE	PEBH98 KWNH	QPF9IE	ZEXI98 KWNH	Final 38 - 44 h QPF
	0600 - 1200	RBG9JE	PEBI88 KWNH	QPF9JE	ZEXJ98 KWNH	Final 44 - 50 h QPF
	1200 - 1800	RBG9KE	PEBI98 KWNH	QPF9KE	ZEXK98 KWNH	50 - 56 h QPF**
	1800 - 0000	RBG9LE	PEBJ88 KWNH	QPF9LE	ZEXL98 KWNH	56 - 62 h QPF**
	0000 - 0600	RBG9OE	PEBJ98 KWNH	QPF9OE	ZEXM98 KWNH	62 - 68 h QPF**
	0600 - 1200	RBG9NE	PEBK98 KWNH	QPF9NE	ZEXN98 KWNH	68 - 74 h QPF**

1800	1800 - 0000	RBG91E	PEIB40 KWNO	QPF91E	ZEXB98 KWNH	0 - 6 h liquid equivalent QPF
1815	0000 - 0000	RBG94Q	PEIE41 KWBC	-----	-----	Preliminary 6-30 h (Day 1) QPF
	0000 - 0600	RBG92E	PEIC43 KWBC	QPF92E	ZEXC98 KWNH	Preliminary 6-12 h QPF
	0600 - 1200	RBG93E	PEID44 KWBC	QPF93E	ZEXD98 KWNH	Preliminary 12-18 h QPF
	1200 - 1800	RBG9EE	PEIE40 KWNO	QPF9EE	ZEXE98 KWNH	Preliminary 18-24 h QPF
	1800 - 0000	RBG9FE	PEIF40 KWNO	QPF9FE	ZEXF98 KWNH	Preliminary 24-30 h QPF
1900	0000 - 0600	RBG9GE	PEBF98 KWNH	QPF9GE	ZEXG98 KWNH	Preliminary 29 - 35 h QPF
	0600 - 1200	RBG9HE	PEBG98 KWNH	QPF9HE	ZEXH98 KWNH	Preliminary 35 - 41 h QPF
	1200 - 1800	RBG9IE	PEBH98 KWNH	QPF9IE	ZEXI98 KWNH	Preliminary 41 - 47 h QPF
	1800 - 0000	RBG9JE	PEBI88 KWNH	QPF9JE	ZEXJ98 KWNH	Preliminary 47 - 53 h QPF
2215	0000 - 0600	RBG92E	PEIC43 KWBC	QPF92E	ZEXC98 KWNH	Final 2 - 8 h QPF
	0600 - 1200	RBG93E	PEID44 KWBC	QPF93E	ZEXD98 KWNH	Final 8 - 14 h QPF
	1200 - 1800	RBG9EE	PEIE40 KWNO	QPF9EE	ZEXE98 KWNH	Final 14 - 20 h QPF
	1800 - 0000	RBG9FE	PEIF40 KWNO	QPF9FE	ZEXF98 KWNH	Final 20 - 26 h QPF
	0000 - 0600	RBG9GE	PEBF98 KWNH	QPF9GE	ZEXG98 KWNH	Final 26 - 32 h QPF
	0600 - 1200	RBG9HE	PEBG98 KWNH	QPF9HE	ZEXH98 KWNH	Final 32 - 38 h QPF
	1200 - 1800	RBG9IE	PEBH98 KWNH	QPF9IE	ZEXI98 KWNH	Final 38 - 44 h QPF
	1800 - 0000	RBG9JE	PEBI88 KWNH	QPF9JE	ZEXJ98 KWNH	Final 44 - 50 h QPF
	0000 - 0600	RBG9KE	PEBI98 KWNH	QPF9KE	ZEXK98 KWNH	50 - 56 h QPF**
	0600 - 1200	RBG9LE	PEBJ88 KWNH	QPF9LE	ZEXL98 KWNH	56 - 62 h QPF**
	1200 - 1800	RBG9OE	PEBJ98 KWNH	QPF9OE	ZEXM98 KWNH	62 - 68 h QPF**
	1800 - 0000	RBG9NE	PEBK98 KWNH	QPF9NE	ZEXN98 KWNH	68 - 74 h QPF**
Notes * Winter Issuance Only ** Only Oct 15 - Apr 15						

Table 8. Issuance time, valid time, product ID, and content of 6-hour QPF products.

16.3.2 Content. Products contain 6-hr isohyets depicting 0.01, 0.25, 0.50, 1.0, 2.0, etc., -inch QPF amounts over the conterminous United States.

16.3.3 Format. Sample graphical products are shown in Figures 17 and 18 (the latter is based on the gridded QPFs). Produce gridded products using the International GRIB (GRIdded Binary) format, the description of GRIB is at: <http://www.nco.ncep.noaa.gov/pmb/docs/grib2/> .

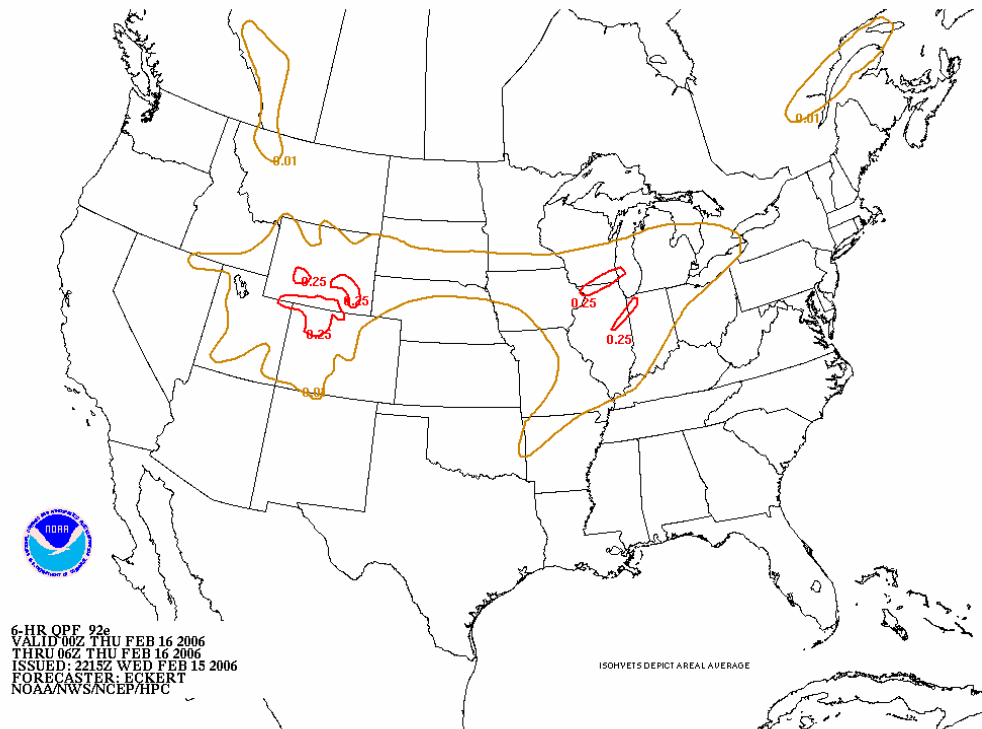


Figure 17. HPC 6-hr QPF graphic showing expected precipitation using predefined isohyets.

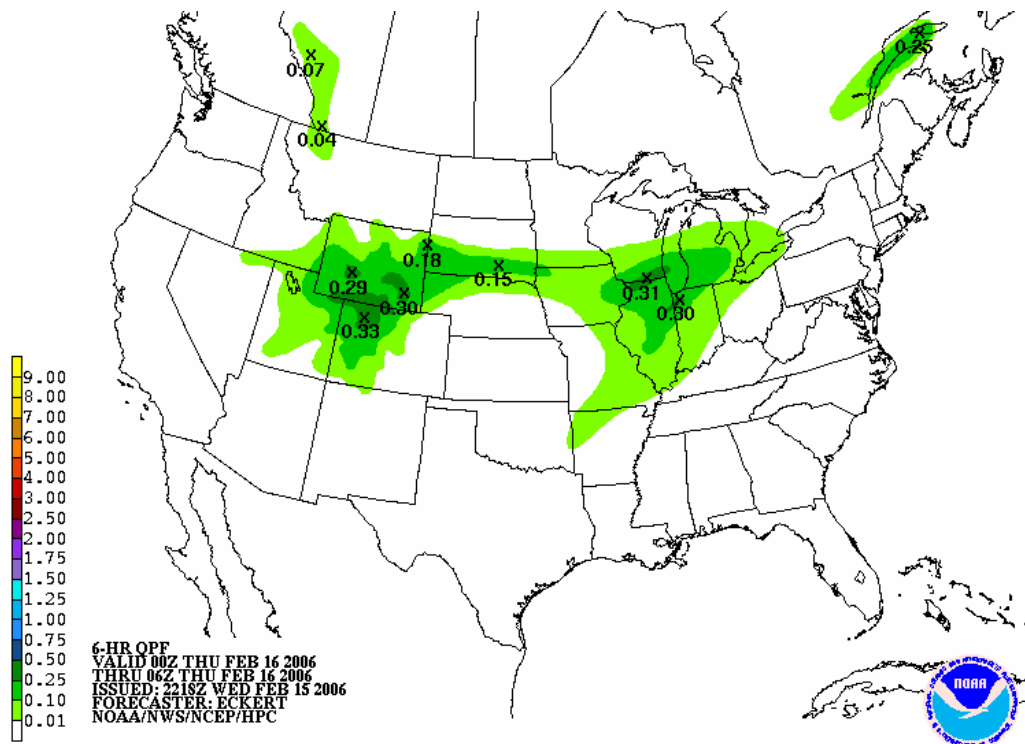


Figure 18. HPC 6-hr QPF graphic showing expected precipitation, based on gridded data.

16.4 Updates, Amendments and Corrections. Update if requested by an RFC. Issue corrections when necessary.

17. 24-Hour Quantitative Precipitation Forecast (Day 1 - 3). These products, prepared by the HPC, delineate QPF amounts in the CONUS for specified 24-hour periods.

17.1 Mission Connection. These products help the NWS to meet its mission by providing RFCs with forecast precipitation information used in the river modeling and forecasting process. The product also supports WFO public weather programs.

17.2 Issuance Guidelines.

17.2.1 Creation Software. Use N-AWIPS software to generate these products.

17.2.2 Issuance Criteria. Issue the product routinely.

17.2.3 Issuance Time. Issue products according to the schedule indicated in Table 9.

17.2.4 Valid Time. See Table 9.

17.3 Technical Description. Products should follow the format and content described in this section.

17.3.1 Dissemination. Disseminate on AWIPS according to Table 9. Also post products on the Internet for general public use at: http://www.hpc.ncep.noaa.gov/qpf/fill_94qwbq.gif.

HPC CONUS 24-h QPF Product Schedule				
Issuance Time (UTC)	Valid Time (UTC)	AWIPS ID	WMO Header	Product Description
0615	1200 – 1200	RBG94Q	PEIE41 KWBC	Preliminary 6 - 30 h (Day 1) QPF
0700	1200 – 1200	RBG98Q	PEII42 KWBC	Preliminary 29 - 53 h (Day 2) QPF
1015	1200 - 1200	94Q	PEIE41 KWBC	Final 2 - 26 h (Day 1) QPF
	1200 - 1200	98Q	PEII42 KWBC	Final 26 - 50 h (Day 2) QPF
	1200 – 1200	99Q	PEIK98 KWNH	50 - 74 h (Day 3) QPF
1815	0000 – 0000	94Q	PEIE41 KWBC	Preliminary 6 - 30 h (Day 1) QPF
1900	0000 – 0000	98Q	PEII42 KWBC	Preliminary 29 - 53 h (Day 2) QPF
2215	0000 - 0000	94Q	PEIE41 KWBC	Final 2 - 26 h (Day 1) QPF
	0000 - 0000	98Q	PEII42 KWBC	Final 26 - 50 h (Day 2) QPF
	0000 – 0000	99Q	PEIK98 KWNH	50 - 74 h (Day 3) QPF

Table 9. Issuance time, valid time, product ID, and content of 24-hour QPF products.

17.3.2 Content. These products represent 24-hr isohyets depicting 0.01, 0.25, 0.50, 1.0, 2.0, etc., -inch QPF amounts over the United States. The products also show the rain-snow line or areas of predominately snow, as appropriate for the season.

17.3.3 Format. A sample 24-hr QPF graphic using predefined isohyets is shown in Figure 19.

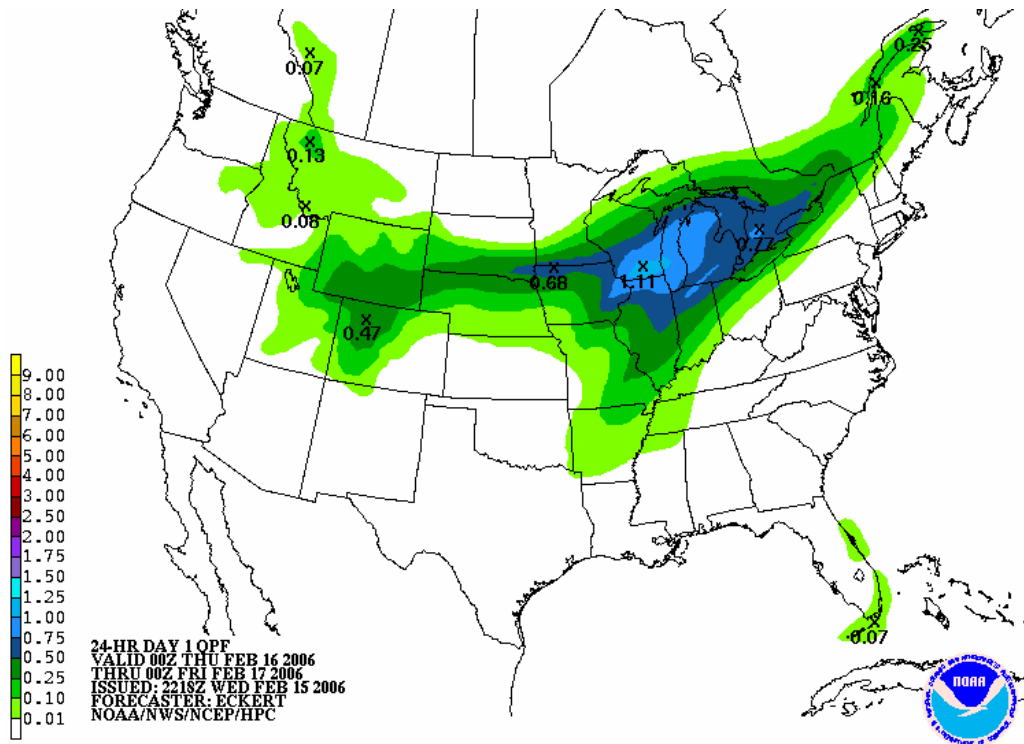


Figure 19. Example of a 24-hour QPF graphic.

17.4 Update, Amendments and Corrections. Update this product if requested by an RFC. Issue corrections as needed.

18 Quantitative Precipitation Forecast Discussion (PFD). This product, prepared by the Hydrometeorological Prediction Center (HPC), provides a discussion supporting QPF products in the CONUS for day 1, 2, and 3 (94Q, 98Q, 99Q).

18.1 Mission Connection. This product helps the NWS meet its mission by maximizing forecaster understanding of QPF products, thus ensuring production of the best possible hydrologic forecast information for partners and other users.

18.2 Issuance Guidelines.

18.2.1 Creation Software. Use appropriate COTS word processing software.

18.2.2 Issuance Criteria. Issue the product routinely.

18.2.3 Issuance Time. 2300, 0700, 1100, and 1900 UTC.

18.2.4 Valid Time. 0000-0000 UTC and 1200-1200 UTC. The product expires after valid time.

18.3 Technical Description. The quantitative precipitation forecast discussion should follow the format and content described in this section. It is published on the web at:

<http://www.hpc.ncep.noaa.gov/discussions/qpfpdf.html> .

18.3.1 MND Header. Use QUANTITATIVE PRECIPITATION FORECAST DISCUSSION.

18.3.2 Content. A text message describing the meteorological reasoning used to create the 94Q, 98Q, and 99Q products.

18.3.3 Format. The generic format is shown in Figure 20 below.

```
FXUS04 KWBC ddhhmm
QPF PFD

QUANTITATIVE PRECIPITATION FORECAST DISCUSSION
NWS HYDROMETEOROLOGICAL PREDICTION CENTER CAMP SPRINGS MD
Time am/pm time_zone day mon dd yyyy

FINAL DAY 1...DAY 2 AND DAY 3 QPF DISCUSSION
VALID mon dd/hhmm UTC THRU mon dd/hhmm UTC
REFERENCE AWIPS GRAPHICS UNDER...PRECIP ACCUM - 24HR
<Highlight(s) for all days>
DAY 1...

<Discussion for day 1>
DAY 2...

<Discussion for day 2>
DAY 3...

<Discussion for day 3>
<forecaster name(s)>
GRAPHICS AVAILABLE ON THE WEB AT www.hpc.ncep.noaa.gov

<QPF vector coordinates>

$$
```

Figure 20. Generic format for Quantitative Precipitation Forecast Discussion.

18.4 Updates, Amendments and Corrections. Do not issue updates. Correct for format and grammatical errors as required.

19. 5-Day Quantitative Precipitation Forecast. This product, prepared by the HPC, provides a 5-day CONUS QPF total.

19.1 Mission Connection. This product helps the NWS to meet its mission by highlighting areas expected to receive significant cumulative precipitation over the five day forecast horizon, thus providing information which can be used in near-term flood outlooks such as the Significant River Flood Outlook (see Section 5, above, and NWS Directive 10-912). In addition, this product is used by the general public, the media and other government agencies for planning purposes.

19.2 Issuance Guidelines.

19.2.1 Creation Software. Use N-AWIPS software.

19.2.2 Issuance Criteria. This product is issued on a regular schedule.

19.2.3 Issuance Time. 1815 UTC.

19.2.4 Valid Time. 1200 UTC on the day of issuance to 1200 UTC five days later.

19.3 Technical Description.

19.3.1 Dissemination. Disseminate on AWIPS. This product is available on the web at: <http://www.hpc.ncep.noaa.gov/qpf/day1-5.shtml>.

19.3.2 Content. This graphical product depicts the 5-day total precipitation expected. It is produced by a simple arithmetic addition of the 94Q, 98Q, 99Q issued at 1015 UTC, and combined with a 48-hr QPF produced by the HPC medium range forecaster.

19.3.3 Format. A sample 5-day total QPF product is shown in Figure 21 below.

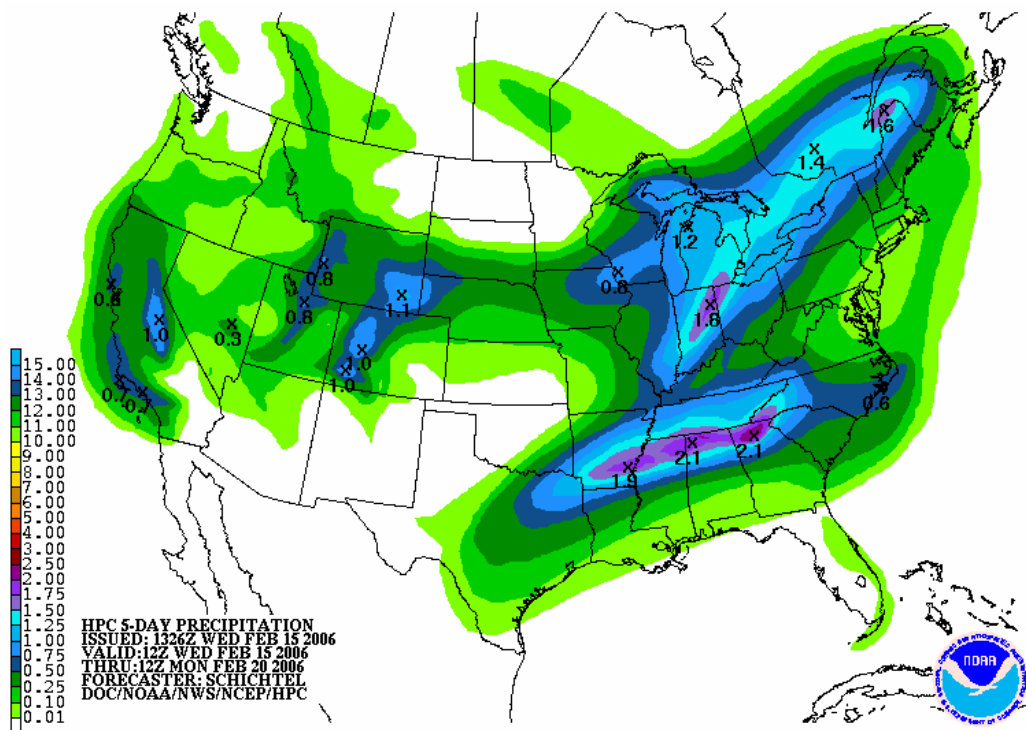


Figure 21. Example of a 5-day total QPF product.

19.4 Updates, Amendments, and Corrections. HPC will update this product if conditions warrant. Corrections are sent out as needed.

Appendix A

Hydrometeorological Automated Data System Report (RRS) Product Headers
For Individual Weather Forecast Offices and River Forecast Centers
 (Reference Section 7)

WFO	WMO Header	AWIPS Header
Aberdeen SD	SXUS42 KWOH	RRS ABR
Albany NY	SRUS38 KWOH	RRS ALY
Albuquerque NM	SRUS75 KWOH	RRS ABQ
Amarillo TX	SRUS76 KWOH	RRS AMA
Anchorage AK	SRAK40 KWOH	RRS AFC
Atlanta GA	SRUS59 KWOH	RRS FFC
Austin/San Antonio TX	SRUS82 KWOH	RRS EWX
Baltimore MD/Washington DC	SRUS47 KWOH	RRS LWX
Billings MT	SXUS58 KWOH	RRS BYZ
Binghamton NY	SRUS37 KWOH	RRS BGM
Birmingham AL	SRUS67 KWOH	RRS BMX
Bismarck ND	SXUS52 KWOH	RRS BIS
Boise ID	SXUS69 KWOH	RRS BOI
Boston MA	SRUS39 KWOH	RRS BOX
Brownsville TX	SRUS85 KWOH	RRS BRO
Buffalo NY	SRUS36 KWOH	RRS BUF
Burlington VT	SRUS35 KWOH	RRS BTV
Caribou ME	SRUS33 KWOH	RRS CAR
Central Illinois IL	SXUS30 KWOH	RRS ILX
Central Pennsylvania PA	SRUS42 KWOH	RRS CTP
Charleston SC	SRUS55 KWOH	RRS CHS
Charleston WV	SRUS46 KWOH	RRS RLX
Cheyenne WY	SXUS54 KWOH	RRS CYS
Chicago IL	SXUS31 KWOH	RRS LOT
Cincinnati OH	SRUS45 KWOH	RRS ILN
Cleveland OH	SRUS44 KWOH	RRS CLE
Columbia SC	SRUS54 KWOH	RRS CAE
Corpus Christi TX	SRUS84 KWOH	RRS CRP
Dallas/Fort Worth TX	SRUS80 KWOH	RRS FWD
Denver CO	SXUS55 KWOH	RRS BOU
Des Moines IA	SXUS40 KWOH	RRS DMX
Detroit MI	SXUS21 KWOH	RRS DTX
Dodge City KS	SXUS47 KWOH	RRS DDC
Duluth MN	SXUS35 KWOH	RRS DLH
Eastern North Dakota ND	SXUS41 KWOH	RRS FGF
El Paso TX	SRUS79 KWOH	RRS EPZ
Elko NV	SXUS68 KWOH	RRS LKN

Eureka CA	SXUS77 KWOH	RRS EKA
Fairbanks AK	SRAK41 KWOH	RRS AFG
Flagstaff AZ	SXUS64 KWOH	RRS FGZ
Glasgow MT	SXUS59 KWOH	RRS GGW
Goodland KS	SXUS48 KWOH	RRS GLD
Grand Junction CO	SXUS57 KWOH	RRS GJT
Grand Rapids MI	SXUS22 KWOH	RRS GRR
Great Falls MT	SXUS60 KWOH	RRS TFX
Green Bay WI	SXUS33 KWOH	RRS GRB
Greenville/Spartanburg SC	SRUS53 KWOH	RRS GSP
Guam PC	SRPA41 KWOH	RRS GUM
Hastings NE	SXUS49 KWOH	RRS GID
Honolulu HI	SRPA40 KWOH	RRS HFO
Houston/Galveston TX	SRUS83 KWOH	RRS HGX
Indianapolis IN	SXUS24 KWOH	RRS IND
Jackson KY	SXUS25 KWOH	RRS JKL
Jackson MS	SRUS68 KWOH	RRS JAN
Jacksonville FL	SRUS60 KWOH	RRS JAX
Juneau AK	SRAK42 KWOH	RRS AJK
Kansas City MO	SXUS39 KWOH	RRS EAX
Key West FL	SRUS63 KWOH	RRS EYW
Knoxville/Tri Cities TN	SRUS56 KWOH	RRS MRX
La Crosse WI	SXUS37 KWOH	RRS ARX
Lake Charles LA	SRUS69 KWOH	RRS LCH
Las Vegas NV	SXUS67 KWOH	RRS VEF
Little Rock AR	SRUS72 KWOH	RRS LZK
Los Angeles CA	SXUS80 KWOH	RRS LOX
Louisville KY	SXUS26 KWOH	RRS LMK
Lubbock TX	SRUS77 KWOH	RRS LUB
Marquette MI	SXUS34 KWOH	RRS MQT
Medford OR	SXUS74 KWOH	RRS MFR
Melbourne FL	SRUS61 KWOH	RRS MLB
Memphis TN	SRUS58 KWOH	RRS MEG
Miami FL	SRUS62 KWOH	RRS MFL
Midland/Odessa TX	SRUS78 KWOH	RRS MAF
Milwaukee WI	SXUS32 KWOH	RRS MKX
Minneapolis MN	SXUS36 KWOH	RRS MPX
Missoula MT	SXUS61 KWOH	RRS MSO
Mobile AL	SRUS66 KWOH	RRS MOB
Moorehead City NC	SRUS51 KWOH	RRS MHX
Nashville TN	SRUS57 KWOH	RRS OHX
New Orleans/Baton Rouge LA	SRUS70 KWOH	RRS LIX
New York City NY	SRUS40 KWOH	RRS OKX
North Central Lower Michigan MI	SXUS20 KWOH	RRS APX

North Platte NE	SXUS50 KWOH	RRS LBF
Northern Indiana IN	SXUS23 KWOH	RRS IWX
Oklahoma City OK	SRUS74 KWOH	RRS OUN
Omaha NE	SXUS44 KWOH	RRS OAX
Paducah KY	SXUS27 KWOH	RRS PAH
Pendleton OR	SXUS72 KWOH	RRS PDT
Philadelphia PA./Mt Holly NJ	SRUS41 KWOH	RRS PHI
Phoenix AZ	SXUS66 KWOH	RRS PSR
Pittsburgh PA	SRUS43 KWOH	RRS PBZ
Pocatello/Idaho Falls ID	SXUS62 KWOH	RRS PIH
Portland ME	SRUS34 KWOH	RRS GYX
Portland OR	SXUS73 KWOH	RRS PQR
Pueblo CO	SXUS56 KWOH	RRS PUB
Quad Cities IA	SXUS38 KWOH	RRS DVN
Raleigh/Durham NC	SRUS50 KWOH	RRS RAH
Rapid City SD	SXUS51 KWOH	RRS UNR
Reno NV	SXUS75 KWOH	RRS REV
Riverton WY	SXUS53 KWOH	RRS RIW
Roanoke VA	SRUS49 KWOH	RRS RNK
Sacramento CA	SXUS76 KWOH	RRS STO
Salt Lake City UT	SXUS63 KWOH	RRS SLC
San Angelo TX	SRUS81 KWOH	RRS SJT
San Diego CA	SXUS81 KWOH	RRS SGX
San Francisco Bay Area CA	SXUS78 KWOH	RRS MTR
San Joaquin Valley CA	SXUS79 KWOH	RRS HNX
San Juan PR	SRUS86 KWOH	RRS SJU
Seattle/Tacoma WA	SXUS71 KWOH	RRS SEW
Shreveport LA	SRUS71 KWOH	RRS SHV
Sioux Falls SD	SXUS43 KWOH	RRS FSD
Spokane WA	SXUS70 KWOH	RRS OTX
Springfield MO	SXUS28 KWOH	RRS SGF
St. Louis MO	SXUS29 KWOH	RRS LSX
Tallahassee FL	SRUS65 KWOH	RRS TAE
Tampa Bay Area FL	SRUS64 KWOH	RRS TBW
Topeka KS	SXUS45 KWOH	RRS TOP
Tucson AZ	SXUS65 KWOH	RRS TWC
Tulsa OK	SRUS73 KWOH	RRS TSA
Wakefield VA	SRUS48 KWOH	RRS AKQ
Wichita KS	SXUS46 KWOH	RRS ICT
Wilmington NC	SRUS52 KWOH	RRS ILM

Table A-2. RRS product headers, by RFC.

RFC	WMO Header	AWIPS Header
Alaska-Pacific RFC	SRUS32 KWOH	RRS ACR
Arkansas-Red Basin RFC	SRUS26 KWOH	RRS TUA
California-Nevada RFC	SRUS30 KWOH	RRS RSA
Colorado Basin RFC	SRUS29 KWOH	RRS STR
Lower Mississippi RFC	SRUS24 KWOH	RRS ORN
Middle Atlantic RFC	SRUS21 KWOH	RRS RHA
Missouri Basin RFC	SRUS27 KWOH	RRS KRF
North Central RFC	SRUS28 KWOH	RRS MSR
Northeast RFC	SRUS20 KWOH	RRS TAR
Northwest RFC	SRUS31 KWOH	RRS PTR
Ohio RFC	SRUS22 KWOH	RRS TIR
Southeast RFC	SRUS23 KWOH	RRS ALR
West Gulf RFC	SRUS25 KWOH	RRS FWR